TMO

Targets Management Office

YMQM-171A

43rd Annual Targets, UAVs and Range Division Symposium

Monterey, CA

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BACKGROUND

The proliferation of unmanned aerial vehicles worldwide has increased the concern that these systems could be employed against US forces in the future.

TMO initiated an unmanned aerial vehicle – target (UAV-T) project in 1997 to support Stinger Block II test requirements. Termination of Stinger Block II development by PBD 745 resulted in delay of the UAV-T development effort.

Identification of a UAV-T requirement by SLAMRAAM project office to support DT and OT resulted in reactivation of UAV-T development effort in 2004.

UAV–T OVERVIEW

- Technical Characteristics of UAVs Vary Widely
- Feasible to Group into Classes of UAVs

  - Man Portable (Hand Launched – Limited Range)

  - Tactical (Low Speed – Low Altitude)

  - Vertical Take-off and Landing (VTOL)

  - Medium Range (High Speed)

  - Medium Altitude Endurance

  - High Altitude Endurance

UNMANNED AERIAL VEHICLE TYPES

HIGH ALTITUDE, ENDURANCE UAV
40,000’-65,000’ ALTITUDE, 12+ HOURS ENDURANCE

MEDIUM ALTITUDE, ENDURANCE UAV
20,000’-40,000’ ALTITUDE, 12+ HOURS ENDURANCE

MEDIUM RANGE
40,000’, 700 NM, Mach .91

MAN PORTABLE CLASS UAV
100’-500’, <1 HOUR

TACTICAL CLASS UAV
100’ - 20,000’ ALTITUDE, > 2 HOURS ENDURANCE

VTOL UAV
100’-20,000’ ALTITUDE, > 2 HOURS ENDURANCE

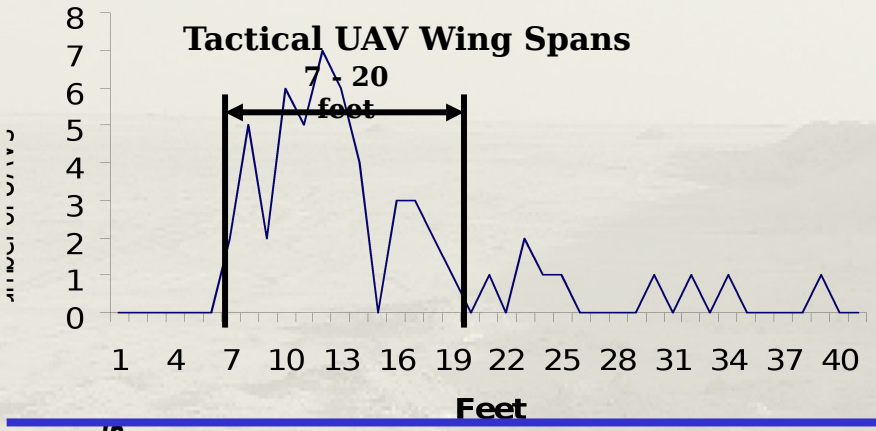
PRELIMINARY EFFORTS

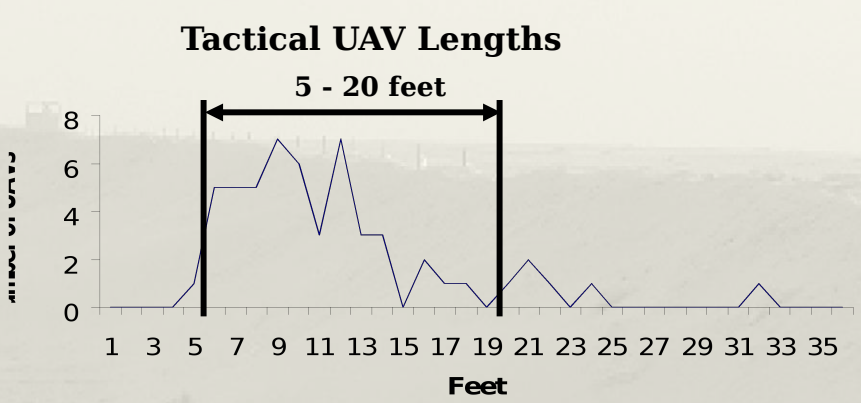
- Reviewed existing targets
- Reviewed existing UAV systems
- Conducted informal market survey

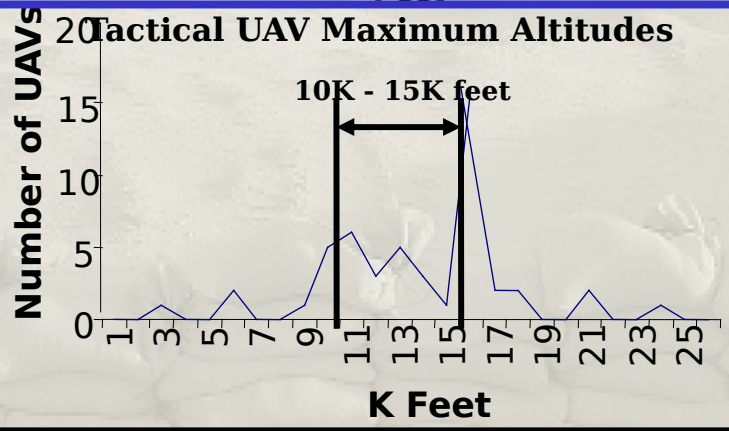
EXAMPLES OF POTENTIAL UAV THREATS

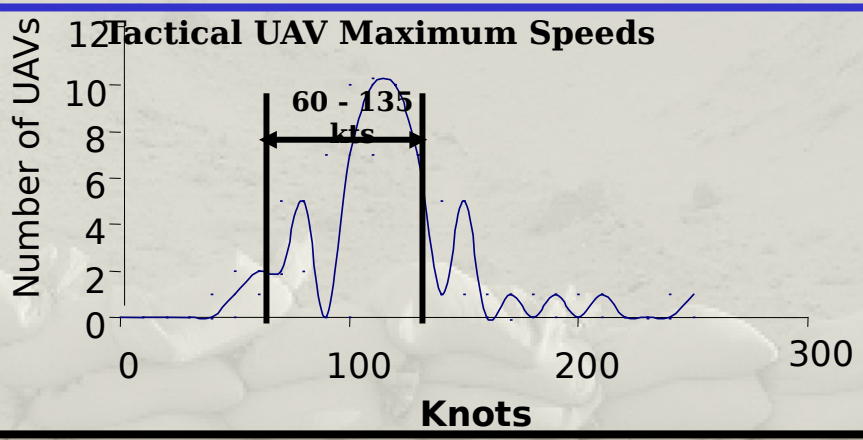
DESIGNATION	COUNTRY /Manufacturer	LENGTH (FEET)	WING SPAN (FEET)	WEIGHT (LBs)	SPEED (MPH)	ENDURANCE (HOURS)	MAX ALT. (FEET)
Tactical Class							
Yak-061(Shmel)	RU - Yakovlev	9.1	10.6	285	87	2	9,840
Tucan	GE - STN	7.4	11.9	330	155	10	15,000
Searcher	IS - IAI	16.7	23.7	818	121	12	15,000
Fox AT1/AT2	FR - CAC Systems	9.1	12	250	120	5	10,000
Mirach 26	IT - Meteor	12.4	15.5	440	138	7	13,000

UAV – T TACTICAL UAV CLASS PARAMETERS









UAV-T ORD (Rev 1) REQUIREMENTS

	THRESHOLD	OBJECTIVE
Minimum Operational Altitude	<1,000 ft AGL	same
Altitude Ceiling	12,000 ft MSL	23,000 ft MSL
Minimum Cruise Speed	60 knots	50 knots
Maximum Cruise Speed	115 knots	200 knots
Minimum Air Vehicle Control Slant Range	25 Km	50 Km
Wing Span Between 3-5 m	~ 5 m	Variable
Overall Length	~4 m	Variable Between 2-5 m
Fuselage Diameter	≥ 0.5 m	same
Propulsion Configuration	Pusher Prop	Variable
Loiter Endurance	1 Hour at Operational Altitude and Range	same
IR Signature Both	none	Adjustable in Intensity and Location
RF Signature	none	Low Radar Cross Section With Enhancement
Capability		

UAV-T ORD (Rev 1) REQUIREMENTS (Concluded)

	THRESHOLD	OBJECTIVE
Visual Signature	None	Tailorable
Air Vehicle Payload	15 lbs / 28 VDC power	same
Flight Termination	Range Safety Flight Termination Capability	same
Launch	Point Launch	same
Recovery	Parachute, or Similar	same
Operational Control	Line of Sight and Operations Beyond Visual Range. Pre-programmable.	same
Navigation Accuracy	+/- 100’ Altitude +/- 10 Knots Airspeed +/- 3° Heading	same
Data Link	Sufficient to Maintain Positive Control of Airborne Components	same

UAV–T DEVELOPMENT EFFORT

- Design contract awarded to Griffon Aerospace
  - Performance specification to meet ORD requirements
  - Target Tracking and Control System – UHF (TTCS-U) required for control
  - Critical design review successfully completed in Oct 04
- Authorization to fabricate prototypes issued to Griffon Aerospace
  - Fabricate four air vehicles and two sets of ground equipment
  - Software integration into TTCS-U
  - Development of operations and maintenance manuals
  - Train TMO Aerial Target Flight Services contractor personnel
  - Demonstration of prototype capabilities will be conducted by TMO Aerial

UAV-T LOW COST EMPHASIS

- MQM-107 Study showed major operational cost are:
  - Expendables (RATO, squibs)
  - Recovery damage
- No Explosives, Pyrotechnics or Hazardous Material
- UAV-T Design includes
  - Pneumatic Launcher- no Pyrotechnics or RATO
  - Alternative Recovery System- reinforced belly structure for belly landing with parachute as back up
  - Common aerial target control system - TTCS-U with Common Avionics Package-Lite

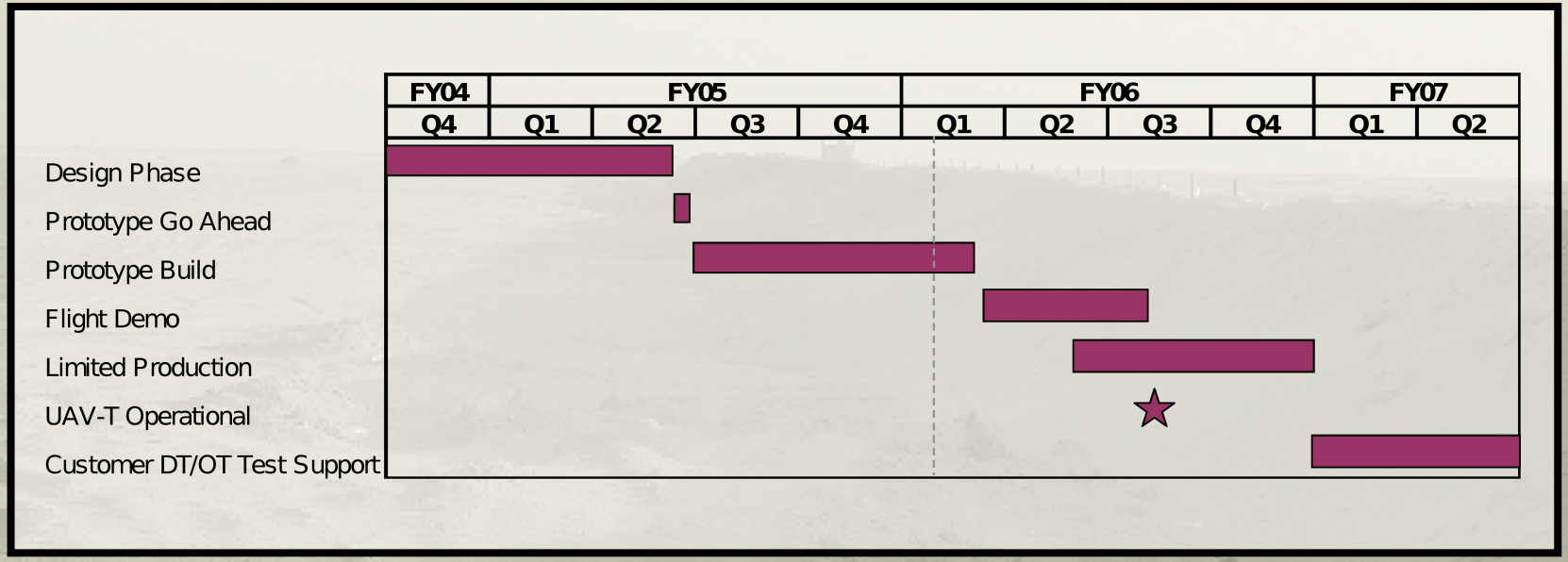
UAV–T CURRENT STATUS

- Prototype / Production tooling fabrication completed
- Autopilot system demonstrated on Outlaw Remotely Piloted Vehicle Target
- Software development for TTCS-U completed, verification testing underway
- Emergency parachute recovery system design approved

UAV –T CURRENT STATUS (cont.)

- First two prototype air vehicles underway
- First set of unique ground support equipment underway
- First exploratory flights scheduled for week of 5 December

SCHEDULE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Design Phase
Prototype Go Ahead
Prototype Build
Flight Demo
Limited Production
UAV-T Operational
Customer DT/OT Test Support

PICTURES OF UAV-T PROTOTYPE

SUMMARY

- UAV-T will provide a generic, tactical class unmanned aerial vehicle target system for test support

- UAV-T prototype effort is underway

- Prototype air vehicle components, autopilot, and control system integration progressing on schedule

- Project is on track to meet SLAMRAAM DT/OT test schedule and will be available to support other weapons systems with unmanned aerial vehicle